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Piezoelectric effect in sodium benzoylacetonate compound

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The aim of this work is to study the piezoelectric effect of sodium benzoylacetonate in order to throw some light on the relation between the piezoelectric effect in this compound and that in sodium acetylacetonate materials (Tawfik 1975).

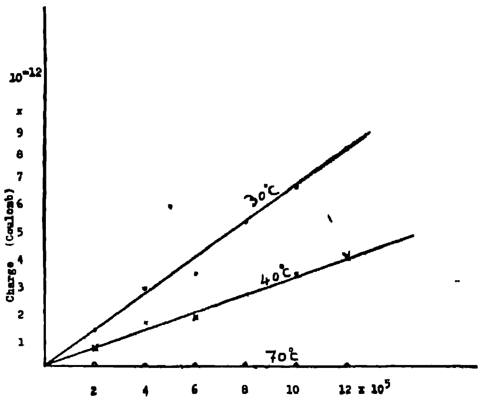

Fig. 1

Na (ben. ac.) was prepared from the reaction of sodium ethoxide with benzoylacetonate. The powder was compressed into tablets and then polarized for one hour at room temperature by applied field of (100 V/mm). The polarised samples were then tested after one hour.

The open circuit voltage was measured by connecting universal voltometer (Tesla BM E88E)across the sample The generated charges were recorded also by Galvanometer (VEB K) Meotechnik Mollenback/Thur. (App Nr. 94554)

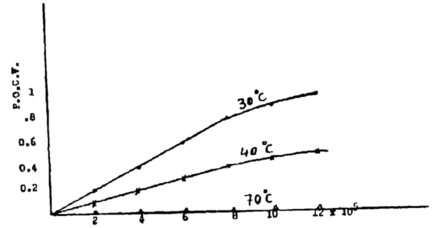

Fig. 2

It is well known that 180°C domains are responsible for piezoelectric effects in the crystals These domains were remained entirely after removing the pol-

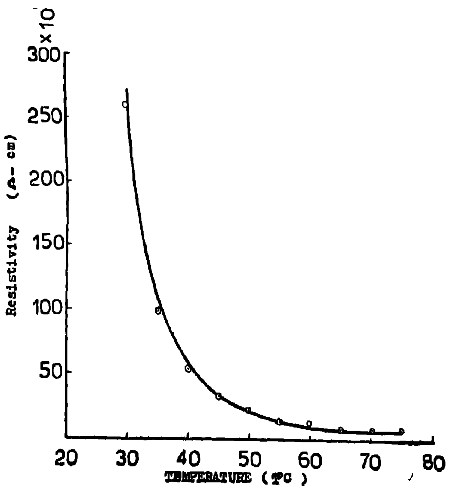

Fig. 3

ing field. The strength of polarisation increased with impressing stress resulting in a higher net polarization at the surface of the sample.

The stress dependence of the generated charges is linear because the charges appearing on the electrode surfaces maintain an electric field in the same direction as the original poling field. This field encourage the domains to be reoriented after releasing the static stress.

The non-linear behaviour of the stress dependence of the electric field is due to piezoelectrically generated electric field tend to maintain in the opposite direction to the original poling field and domain reorientation occurs even less readily under open circuit than short circuit conditions. It is obvious that the behaviour of the piezoelectric effect in polarized sod. ben. ac. is similar to that of the sod. acetylacetonate The increase of conduction through the sample with raising temperature (figure 3) caused the decrease of the piezoelectric response due to disturbance of the dipole orientation.

At 70°C the polarisation disappeared and the material became unpiezoelectric due to partial chemical transformation that took place in the material.

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Analysis of the strain derivative of the Szigeti effective charge parameter in alkali halides

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The concept of effective ionic charge introduced by Szigeti (1949, 1950) has been widely used in the studies of dielectric and lattice dynamical behaviour of ionic crystals. An excellent discussion of the Szigeti effective charge parameter e_s^* for alkali halides has been made by Lowndes & Martin (1969). Studies based on the various theoretical models (Dick & Overhauser 1958, Hardy 1962, Mitskevitch 1964) have revealed that the deviation of e_s^* from the nominal charge can be interpreted as a measure of ionic distortions in crystals. The amount of overlap and

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